

I claim:

1. Apparatus for simultaneously making electrical contact with an array of contact points having a first selected pattern on a circuit, comprising:

a support substrate having a working surface and a back side, said support substrate defining a multiplicity of apertures extending from said backside through said substrate and terminating at said working surface according to a second selected pattern corresponding to a mirror image of said first selected pattern;

a multiplicity of conductive probes, said conductive probes extending from a first end at said back side of said support structure, through said apertures to a contact end located a selected distance beyond said working surface;

at least one aperture of said multiplicity of apertures including at least two conductive probes extending there-through;

a multiplicity of conductive pathways extending from said first end of said conductive probes to selected circuitry; and

said conductive probes positioned through said support substrate to make electrical contact with contact points on a circuit placed against said apparatus.

2. The apparatus of Claim 1 wherein said support substrate comprises a planer insulating material.

3. The apparatus of Claim 1 wherein said contact points are conductive bumps or balls.

4. The apparatus of Claim 1 wherein said at least two conductive probes extending through said at least one aperture are connected one each to a voltage source line and a voltage sensing device.

5. The apparatus of Claim 4 and further including a third conductive probe connected to another voltage source.

6. The apparatus of Claim 1 wherein said apparatus is a probe card for testing integrated circuits.

7. Apparatus for simultaneously making electrical contact with an array of contact points positioned according to a first selected pattern on a circuit comprising:

an insulating support substrate having a working surface and a back side;

a multiplicity of conductive probes, each of said conductive probes extending from a first end at said backside of said substrate, through said substrate to a contact end, contact ends of said multiplicity of conductive probes extending a selected distance beyond said working surface and terminating at a multiplicity of locations arranged according to a second selected pattern corresponding to a mirror image of said first selected pattern;

at least two conductive probes of said multiplicity of having their ends adjacent each other at a single one of said multiplicity of locations; and

said contact ends of said conductive probes positioned through said support substrate to make electrical contact with selected ones of said contact points on a circuit placed against said apparatus.

8. The apparatus of Claim 7 wherein at least two of said multiplicity of locations include at least two of said conductive probes.

9. The apparatus of Claim 7 wherein at least two of said multiplicity of locations include at least three of said conductive probes.

10. The apparatus of Claim 7 wherein said apparatus is a probe card for testing integrated circuits.

11. A method of manufacturing apparatus for simultaneously making electrical contact with an array of contact points on circuitry, said circuitry having said array of contact points positioned according to a first selected pattern, comprising the steps of:

providing a support substrate having a working surface and a backside;

defining a multiplicity of apertures extending from said backside through said substrate and terminating at said working surface according to a second selected pattern, said second selected pattern corresponding to a mirror image of said first selected pattern;

extending a multiplicity of first conductive probes through said multiplicity of apertures such that a first end is at said back side and a contact end extends a selected distance beyond said working surface;

extending a second conductive probe having a first end and a contact end through at least one of said multiplicity of apertures; and

positioning said multiplicity of apertures such that said contact ends of said conductive probes are aligned to make electrical contact with at least a portion of said array of contact points of a circuit placed against said apparatus.

12. The method of Claim 11 and further comprising the steps of placing circuitry having an array of contact points against said apparatus and testing said circuitry.

13. The method of claim 11 wherein a selected probe of said multiplicity of first conductive probes is for supplying a selected voltage and said second conductive probe adjacent said selected probe is for sensing a voltage.

14. The method of manufacturing apparatus for simultaneously making electrical contact with an array of contact points on circuits having said array of contact points positioned according to a first selected pattern comprising the steps of:

providing a support substrate having a backside and a working surface;
extending a multiplicity of first conductive probes through said support substrate, each of said first conductive probes extending from a first end at said backside of said substrate, through said substrate to a contact end, said contact ends of said conductive probes extending a selected distance beyond said working surface and terminating at a multiplicity of locations according to a second selected pattern corresponding to a mirror image of said first selected pattern;

extending at least one second conductive probe having a first end and a contact end through said substrate, said contact end of said at least one second

conductive probe terminating adjacent the contact end of one of said multiplicity of first conductive probes; and

positioning said contact ends such that said conductive probes are aligned so as to make electrical contact with said array of contact points of a circuit placed against said apparatus.

15. The method of Claim 14 and further comprising the steps of placing circuitry having an array of contact points against said apparatus and testing said circuitry.

16. The method of claim 14 wherein a selected probe of said multiplicity of first conductive probes is for supplying a selected voltage and said second conductive probe adjacent said selected probe is for sensing voltage.

17. Apparatus for contacting a target test point having an area of a first size on an integrated circuit comprising:

a substrate; and

at least two electrically isolated probes supported by said substrate located within an area of a second size for simultaneously contacting said target test point.

18. The apparatus of claim 17 wherein said first area is smaller than said second area.

19. The apparatus of claim 17 wherein said first area is greater than said second area.

20. The apparatus of claim 17 wherein one of said at least two electrically isolated probes is for applying a voltage and a second one of said probes is for sensing a voltage.

21. A process for providing a voltage at a target test point on an integrated circuit comprising the steps of:

- contacting said target test point with first and second probes;
- applying a voltage to said target test point through said first probe;
- sensing a voltage at said target test point through said second probe; and
- adjusting said voltage applied through said first probe until a selected voltage is sensed by said second probe.

22. The process of claim 21 further comprising the steps of contacting said target test point with a third probe, applying another voltage to said target test point through said third probe and adjusting said voltage applied through said third probe until another selected voltage is sensed by said second probe.